the magnetisation established in the at least one annulus provides a torque-dependent magnetic field component which has a significant non-zero value at zero torque or force and an essentially zero value at a non-zero torque or force, as the case may be.

24. A transducer element as claimed in Claim 23 in which the at least one annulus is in the form of an annular ring attachable to a shaft, and the annular ring is of a magnetoelastic material and is circumferentially magnetised.

25. A transducer element as claimed in Claim 23 in which the at least one annulus is of magnetoelastic material and is a circumferentially magnetised, integral portion of a shaft.

26. A transducer element as claimed in Claim 23 in which the at least one annulus is longitudinally magnetised in the direction of said axis.

27. A transducer element as claimed in Claim 26 in which the at least one annulus is an integral portion of a shaft.

28. A transducer element as claimed in Claim 24 comprising a first annulus of magnetised material and a second annulus of magnetised material, wherein said first annulus provides an essentially zero value of magnetic field component at a non-zero torque or force of a given polarity and said second annulus provides an essentially-zero value of magnetic field component at a non-zero torque or force of the opposite polarity.

29. A transducer element as claimed in Claim 27 comprising a first annulus of magnetised material and a second annulus of magnetised material, wherein said first annulus provides an essentially zero value of magnetic field component at a non-zero torque or force of a given polarity and said second annulus provides an essentially-zero value of magnetic field component at a non-zero torque or force of the opposite polarity.

30. A transducer element as claimed in Claim 23 in which said element has a surface extending radially of said axis and comprising a first annulus of magnetisation extending to said surface and a second annulus of magnetisation extending to said surface outwardly of said first annulus, said first annulus and said second annulus being magnetised to provide a magnetic field component therebetween which has a significant non-zero value at zero torque or force, as the case may be, and an essentially zero value at a non-zero torque or force, as the case may be.

31. A transducer element as claimed in Claim 30 in which said first annulus is magnetised in the direction of said axis with a pole of given polarity at said surface and in which said second annulus is magnetised in the direction of said axis with a pole of opposite polarity at said surface.

32. A transducer element as claimed in Claim 30 in which said first annulus and said second annulus are each magnetised to form a respective closed loop of circumferential magnetisation, and the respective closed loops of circumferential magnetisation are of opposite polarity.

33. A transducer element as claimed in Claim 27 comprising a respective further annulus of magnetisation located radially inwardly of the at least one annulus of magnetisation and longitudinally magnetised in the axial direction with a polarity opposite thereto to form a closed loop of magnetic flux therewith.

34. A transducer assembly comprising a transducer element as claimed in Claim 23 and a magnetic sensor arrangement oriented to detect said magnetic field component.

35. A transducer assembly comprising a transducer element as claimed in Claim 24 and a respective magnetic sensor arrangement for the at least one magnetised annulus and oriented to detect a magnetic field component in the direction of said axis.

36. A transducer assembly comprising a transducer element as claimed in Claim 26 and a respective magnetic sensor arrangement for the at least one magnetised annulus and oriented to detect a magnetic field component in the circumferential (tangential) direction about said axis.

37. A transducer assembly comprising a transducer element as claimed in Claim 28 and first and second magnetic sensor arrangements for detecting a respective magnetic field component emanated by said first annulus and said second annulus, each of said first and second magnetic sensor arrangements being oriented to detect a magnetic field component in the direction of said axis.

38. A transducer assembly comprising a transducer element as claimed in Claim 29 and first and second magnetic sensor arrangements for detecting a respective magnetic field component emanated by said first annulus and said second annulus, each of said first and second magnetic sensor arrangements being oriented to detect a magnetic field component in the circumferential (tangential) direction about said axis.

39. A transducer assembly comprising a transducer element as claimed in Claim 30 a magnetic sensor arrangement oriented to detect said magnetic field component provided between said first annulus and said second annulus.

40. A transducer assembly comprising a transducer element as claimed in Claim 31 and a magnetic sensor arrangement located to be responsive to the magnetic field between said first annulus and second annulus and oriented to detect a magnetic field component in the circumferential (tangential) direction about said axis.

41. A transducer assembly comprising a transducer element as claimed in Claim 32 and a magnetic sensor arrangement oriented to detect a radially directed magnetic field component between said first annulus and said second annulus.

42. A torque sensor system comprising a transducer assembly as claimed in Claim 37 responsive to torque applied about said axis, wherein said first and second magnetic field sensor arrangements provide first and second torque-dependent signals respectively, and further including signal processing means which comprises a first channel responsive to at least one of the first and second torque-dependent signals, said first channel comprising an output means having a controllable gain for producing an output signal representing a measure of torque, and which also comprises a second channel comprising means for combining the first and second torque-dependent signals to provide a reference signal, said output means being responsive to said reference signal to adjust its gain in a sense acting to eliminate changes in the response relating the first and second torque-dependent signals with torque.

43. A torque sensor system as claimed in Claim 42 in which the combining means is operable to effect a difference operation on said first and second torque-dependent signals.

44. A torque sensor system as claimed in Claim 43 in which the first channel is responsive to both of said first and second torque-dependent signals to effect a summing operation thereon.

45. A method of forming a transducer element which is as claimed in Claim 23 in which the magnetisation of said at least one annulus is performed while the transducer element is under a predetermined torque of one polarity about said axis.

46. A method of forming a transducer element which is as claimed in Claim 28 in which the magnetisation of the first annulus is performed while the transducer element is under a predetermined torque of one polarity about said axis, and the magnetisation of the second annulus is performed while the transducer element is under a predetermined torque of the opposite polarity about said axis.

47. A method of forming a transducer element as claimed in Claim 28 in which the respective magnetisation of the first annulus and the second annulus are performed to provide magnetisation of opposite polarity.

48. A method as claimed in Claim 46 in which the magnetisation of the first annulus and the second annulus are of the same polarity.

49. A method as claimed in Claim 47 in which the magnetisation of the first annulus is performed under a predetermined torque of opposite polarity to that applied in the magnetisation of the second annulus.

50. A method of forming a transducer element which is as claimed in Claim 30 in which the magnetisation of said first annulus and said second annulus is performed while said element is under a predetermined torque about said axis.

Remarks

Please enter this amendment prior to examination. The earlier Preliminary Amendment erroneously amended the claims in the original PCT patent application whereas the applicant had submitted replacement claims 1 - 28 shown in Exhibit A attached. See the replacement claims referenced in the International Preliminary Examination Report dated May 21, 2001. Hence, cancellation of claims 1 - 22 listed in the Preliminary Amendment is necessary and substitution of